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PROJECTS FOR THE CONTAMINANT PLUMES CONTAINMENT AND REMEDIATION FOCUS AREA

The key characterization problem areas needing innovative technologies for Plumes Focus Area include: detection and monitoring of subsurface contaminants in soils and groundwater; location and spatial extent of dense nonaqueous phase liquids (DNAPL) in the subsurface; groundwater flow and contaminant transport modeling to better assess risk of numerous contaminant plumes in soils and groundwater; and characterization and sampling strategies for more technically defensible and cost-effective site characterization.

Nine technologies addressing these problems are currently under development within CMST-CP and many other technologies have been demonstrated and are undergoing commercialization or implementation at DOE sites.

Subsurface sensors under development include: surface acoustic wave (SAW) sensor, able to be deployed down-well for improved measurement of hazardous volatile organic compounds (VOC); an array of SAW sensors for improved resolution of multiple hazardous volatile organic compounds in soil gas and groundwater; chemical flow probe, deployable down-well, using changeable reagent chemistries for detection of metals and organic compounds; Cone Penetrometer Truck (CPT) sampling devices allowing determination of volatile and semi-volatile contaminants at the cone tip while the CPT rod is still in the ground; testing of several CPT sensors and monitors at the Savannah River Site (SRS); and an improved methodology for site characterization achieving great cost and time savings, currently undergoing implementation throughout the DOE complex.

Projects to improve groundwater flow and contaminant transport modeling include: local and regional modeling of contaminant transport throughout the Siberian Basin in Russia with years of groundwater sampling data for model validation, and several geophysical techniques at Box Canyon on the Idaho National Engineering Laboratory (INEL) site for improved understanding of transport through fractured rock (applicable at several sites including INEL, Hanford, and Oak Ridge National Laboratory [ORNL]).

Finally, the induced polarization technique is under development to noninvasively map DNAPLs in the subsurface.

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